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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,332	07/22/2003	David R. Hembree	3592.8US (97-0321.08/US)	6977
24247	7590	02/21/2006	EXAMINER LEE, CHEUNG	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			ART UNIT 2812	PAPER NUMBER

DATE MAILED: 02/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/624,332

Applicant(s)

HEMBREE, DAVID R.

Examiner

Cheung Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Notice to Applicant***

1. Applicant's Amendments and Response to the Office Action mailed on December 12, 2005 have been entered and made of record.

***Response to Amendment***

2. In view of Applicant's Amendments and arguments filed on December 12, 2005, the rejections of claims 1-6 under 35 U.S.C. 103(a) have been withdrawn. Applicant's arguments have been rendered moot in view of the new ground of rejection given below.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desai et al. (U.S. Patent 6,166,434; hereinafter "Desai") in view of Kim et al. (US Pat. 5552635; hereinafter "Kim"), and further in view of Toy et al. (U.S. Patent 6,451,155; hereinafter "Toy").
4. With respect to claims 1, 3, and 5, referring to figures 2A-2F, Desai discloses a method for assembling a Chip On Board semiconductor device on a substrate 206, said

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Chip On Board semiconductor device (see fig. 2F) having a semiconductor die 200 and a heat sink cap 210 abutting a portion of a top surface of a substrate (see fig. 2D; col. 6, lines 43-59) including: providing an adhesive between a portion of an upper surface 203 of the semiconductor die and a portion of a lower surface of the heat sink cap (col. 6, lines 43-59) for engaging the semiconductor die and heat sink cap (col. 5, lines 60-67) for abutting the edge of the heat sink cap to the substrate (col. 6, lines 43-59) and placing an encapsulant 208 into the heat sink cap for engaging interior portions of the heat sink cap, portions of the semiconductor die, portions of the top surface of the substrate and portions of the adhesive (see fig. 2E; col. 6, line 60-col. 7, line 10). Desai discloses the two sides 214 and 216 of the clip in figure 2B closely engage two edges of the die when the clip is placed over the die (col. 5, lines 60-67). So, the encapsulant engages portions of the adhesive when an underfill material is dispensed into the gap 207 since there is a space between the clip and the die. But Desai does not disclose expressly an adhesive, which is a compliant adhesive-filled gel silicone elastomer, and the heat sink cap, which surrounds the semiconductor die with at least one hole therein.

Toy discloses a silicon-containing polymeric adhesive (e.g., a silicone elastomeric material) being used to attach a heat sink to the multi-chip module (col. 4, lines 26-40). The examiner interpreted that the silicon-containing polymeric adhesive is compliant since the flexibility of the elastomer can be adjusted by manipulating the relative amount of filler (col. 9, line 49-col. 10, line 6). Besides, the steps of engaging the semiconductor die and the heat sink cap in compliant removable adhesion is achieved before the adhesive is fully cured. And it is obvious to apply any form of

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pressure to the semiconductor die into the cap to engage the semiconductor die and the cap.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the adhesive silicone elastomer film as an adhesive between the clip and the semiconductor die. The motivation for doing so would have been to achieve a remarkable heat resistance.

Referring to figures 6-9, Kim discloses a metal cap 109, which encases a semiconductor chip 104, having a hole 106 (see fig. 9).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the metal cap that surrounds the semiconductor die, as taught by Kim. The motivation for doing so would have been to achieve a remarkable protection of all sides of the semiconductor die while dissipating heat.

5. With respect to claims 2, 4, and 6, the combined teaching of Desai, Toy and Kim discloses a method for assembling a Chip On Board semiconductor device on a substrate as set forth in claims 1, 3, and 5, Toy discloses wherein the compliant adhesive-filled gel silicone elastomer includes a cross-linked silicone (col. 9, lines 27-48).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheung Lee whose telephone number is 571-272-5977. The examiner can normally be reached on Monday through Friday from 8:30AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on 571-272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cheung Lee

February 13, 2006



**HA NGUYEN**  
**PRIMARY EXAMINER**